TRANSPIRATION RATES IN SCHEDORHINOTERMES DEROSUS (ISOPTERA: RHINOTERMITIDAE)[1]

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Experiments to determine the effects of temperature and humidity upon the rate of water-loss by transpiration have been performed in insects, and conflicting literature has appeared. Among others, Wigglesworth (1945) reported observing what is generally referred to as the "critical" temperature, beyond which the cuticle becomes permeable. In contrast, Mead-Briggs (1956) found nothing to support these results, but instead demonstrated that the water-loss rate is proportional to the saturation deficit of the surrounding environment.

The present study measured transpiration rates from the cuticles of harvester termites, *Schedorhinotermes derosus* (Hill), which are indigenous to Western Australia.

Materials: Ten termite specimens were gathered from drywood about 7 miles east of Derby, Western Australia. When not exposed to the experimental conditions, they were maintained in isolation in plastic tubes containing moist sand under a controlled milieu (28°C, 65% Relative Humidity). Daily illumination for 14 hours was provided by a 1200 lux source.

Water-loss as a function of humidity: To establish the rate of water-loss under varying humidities at a constant temperature (28°C), each termite was individually set into a small enclosure constructed from aluminum gauze. Measurement of water-loss was achieved by weighing each termite after 18 hour intervals in desiccators kept at controlled humidities by means of mixtures of dilute sulphuric acid. As compensation for differences in termite size, water-loss was stated in mg/cm^2/hr units.

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Findings reveal that the transpiration rate increases with greater saturation deficiency of the desiccator air. In fact, transpiration occurs even when termites are subjected to relative humidities as high as 98%. Results are summarized in Table 1.

TABLE I, Water-loss in mg/ cm^2/hr from *Schedorhinotermes derosus* at 28°C in unsaturated atmosphere.

RELATIVE HUMIDITY (%)	80	85	90	95	98
MEANS	.19	.16	.12	.09	.03
± SE	.02	.02	.02	.01	.01

Values based on 10 specimens

It should be noted that, as saturation levels became high enough for the insects to consume droplets of condensed moisture, there were weight gains.

Water-loss as a function of temperature: Measurement of transpiration rate as a function of temperature was accomplished by weighing specimens immediately prior and following subjection to dry air in a container receiving activated alumina heated in a water-bath. The findings, which are given in Table 2, fail to show a critical transitional temperature.

TABLE 2, Water-loss in mg/ cm^2/ hr from *Schedorhinotermes derosus* in dry air.

TEMPERATURE (°C)	35	40	45	50	55	60	65	70
MEANS	2.17	3.59	4.43	6.01	7.89	9.58	11.45	16.34
± SE	.42	.47	.33	.51	.42	.59	.71	.94

Values based on 10 specimens

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LITERATURE CITED

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ABSTRACT.—The relationship between the rate of water-loss by transpiration and temperature and humidity was studied in harvester termites, *Schedorhinotermes derosus* (Hill). Findings reveal that the transpiration rate increases with greater saturation deficiency in the surrounding atmosphere. No evidence of a "critical" transitional temperature was observed.—BERNARD H. KIME, *Department of Biology, Chaput Valley College, 1564 Parkwood Drive, Napa, CA 94558.*

Descriptors: Isoptera; Rhinotermitidae; *Schedorhinotermes derosus*, transpiration rates; Australia, termite; termite.